



THE SECRETARY OF THE TREASURY
WASHINGTON

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MEMORANDUM FOR:

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FROM:

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SUBJECT:

Review of Economic Assumptions and
Procedures Underlying National Defense
Stockpile Goals

The Federal Emergency Management Agency (FEMA) sets goals for national defense stockpile acquisitions. Several agencies have questioned the methodology employed by FEMA, and, in particular, the assumptions pertaining to the macro and micro economic behavior of the nondefense sectors of the economy. The economic assumptions about the civilian and industrial sectors determine the stockpile goals as much as assumptions about defense expenditure patterns. Serious questions were raised before the CCEA about the appropriateness of these economic assumptions. We are concerned that the economic assumptions and procedures underlying the stockpile methodology have not received sufficient policy-level attention. A policy-level review by this Administration is needed to assure that appropriate policies are used.

The best outside review of the FEMA methodology to date (by the Institute for Defense Analyses) concluded that many economic assumptions are too conservative in that they bias stockpile goals upwards. It goes on to warn that "conservative assumptions for their own sake are not in the best interest of the stockpile policy and only harm its credibility." This lack of credibility is in part responsible for the reluctance of both the Administration and the Congress to meet more rapidly the stockpile goals; greater credibility of assumptions and procedures is in the interest of all who seek an effective stockpile program.

The stockpile methodology and goals are increasingly affecting policy domains only marginally related to the national defense stockpile itself (e.g., barter proposals, Section 232 investigations, government procurement code exemptions, etc.). In light of the serious questions raised before the CCEA, we suggest that NSC initiate and conduct a review of the economic assumptions, procedures, and petroleum and other supply constraints embodied in the stockpile methodology.

We suggest the NSC review proceed as follows:

1. As background, use the OMB briefing paper presented to the Cabinet Council on Economic Affairs on April 5, 1983.
2. Involve the active policy level participation of agencies with economic or foreign policy expertise (e.g., Treasury, CEA, OMB, Commerce, NSC, State, CIA) with authority to elicit information from FEMA and/or the EMPB.
3. Evaluate the appropriateness of the economic planning factors concerning civilian economic activity and austerity levels achievable in wartime.
4. Evaluate other economic assumptions and procedures as necessary and advise FEMA on revisions.
5. Complete the review within ninety days so that revisions can be implemented before any draft of the 1983 stockpile goals is completed and in time for the machine tools Section 232 case.

To assist the NSC, a set of suggested analytic tasks are attached that could serve as a guide in completing the analysis to determine which economic policies, assumptions, and methods are appropriate for the Administration.

Attachment

REVIEW OF ECONOMIC ASSUMPTIONS AND PROCEDURES UNDERLYING NATIONAL DEFENSE STOCKPILE GOALS

Summary

The FEMA stockpile methodology entails a series of interrelated analytic steps that start with GNP output simulations using a macroeconomic model for a three-year conventional war and end up with specific estimates of demand and supply for 69 individual minerals and materials. A large number of economic policy assumptions and analytic assumptions are made throughout the process.

The following tasks are suggested to provide essential information on the effects of certain supply constraints and policy and analytic assumptions used by FEMA. The tasks are interrelated but are divided into two broad categories as shown below. The first is macro for the tasks involving macroeconomic estimates such as GNP, employment, investment, etc. The second is micro for tasks that involve specific supply/demand estimates for the individual materials.

More detailed descriptions of each task are attached.

MACROECONOMIC

- TASK 1 Estimate GNP Output Levels (take into account certain supply, capacity and labor constraints) then determine resources and output remaining for civilian consumption after providing for defense needs. Include an evaluation of civilian austerity assumptions.
- TASK 2 International Trade. This is an integral part of Task 1 but is shown separately because of its importance and effect on GNP levels.
- TASK 3 Economic Policy Assumptions. In completing Task 1, assumptions are necessary on fiscal, tax and other economic policies. This task involves documenting all economic policy assumptions.
- TASK 4 Comparative Assessment. This task requests a detailed comparison of the World War II experience to the results from Tasks 1-3.

MICROECONOMIC

The micro tasks can be done concurrently with the macro tasks but with consistent assumptions where appropriate. For example, if substantial increase in investment is assumed in Task 1 at the macro level, then individual domestic mineral supply estimates would be adjusted accordingly. Also, where a micro task is related to GNP levels, such as material demand, then the appropriate macro output would be used from Task 1.

- TASK 5 Domestic Minerals Supply. This task concentrates on developing individual material supply estimates for domestic production that take into account increases in production capacity.
- TASK 6 International Materials Supply. This task involves developing estimates of available imports by adjusting for lower demand in war zones and for increases in capacity in foreign producing nations resulting from war time pressures.
- TASK 7 Domestic Material Demand. This task involves development of estimates of demand through the use of demand elasticities taking into account substitution and reduced consumption.
- TASK 8 Mobilization Year. This task involves the completion of supply estimates for significant minerals taking into account the warning year assumptions.
- TASK 9 Political Reliability. This task involves alternative procedures in estimating the availability of imports of various materials.

DETAILED TASK DESCRIPTIONS

TASK 1: ESTIMATE GNP LEVELS TAKING INTO ACCOUNT
SUPPLY AND LABOR CONSTRAINTS; LESS DEFENSE
REQUIREMENTS; RESULTING IN OUTPUT REMAINING
FOR CIVILIAN CONSUMPTION

1980 Methodology and Assumptions

The 1980 stockpile goals were based on assumptions of unprecedented simultaneous increases in overall GNP growth for defense and civilian economic activity. Annual GNP growth rates exceed 9% in real terms. It was noted in both the IDA and GAO reviews of the stockpile procedures that reduced wartime petroleum supplies and limited productive capacity may restrict aggregate economic activity and civilian output in several industries. The macroeconomic model projected levels of consumption which exceed NSC austerity guidance and actual 1980-82 consumption levels. Considerable doubts exists about whether the levels are plausible.

1983 Study

To what extent have methods been changed in the 1983 goals study to deal with these concerns?

Evaluation

How would the wartime macroeconomic projections derived from the macroeconomic model differ if the following steps and constraints were introduced into the procedure? (Please provide detailed projections of (A) the base case econometric forecasts, (B) the current wartime econometric forecasts used in the silver scenario, ferroalloys case, and industrial fasteners case, and (C) comparable macroeconomic forecasts under the following procedures.)

- A. Identify total direct defense requirements for real output. Using an appropriate macroeconomic model establish industry production levels for the entire economy subject to the defense requirements.
- B. Establish resource requirements using an input-output model to translate output into required inputs. Identify total (direct and indirect) defense and total civilian requirements for industry outputs and for labor, capital, petroleum and other resource inputs.
- C. Identify all capacity expansions, by industry, year, and cost, which will be necessary to achieve the defense outputs. Identify separately those expansions necessary to achieve the civilian output levels. Specify any assumptions on how these investment will be financed.

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D. The following constraints are to be considered binding in determining the level of total output:

- 1) Maximum oil consumption of (to be provided) million barrels per day (MMBD) with imported oil providing (to be provided) percent of the total.
- 2) Capital stock consistent with initial levels and investment program. Identify all investments by industry, year, cost, and projected capacity and output increases.
- 3) In each industrial sector, maximum capacity utilization rates of capital stocks consistent with observed wartime maximums, where available, or other empirically determined maximum capacity utilization estimates.
- 4) The maximum labor input determined by: (a) setting the minimum unemployment rate equal to the observed minimum in World War II; (b) setting the maximum value for the total civilian labor force participation rate equal to the current rate plus the increase in the total civilian labor force participation rate from 1941 to 1944; and (c) setting the maximum average hours worked per week equal to the current level plus the increase from 1941 to 1944. Assume a 3-year adjustment interval in achieving the maximum labor input.
- 5) Average labor and capital productivity growth should not exceed the average growth observed in World War II. This applies to both the total private domestic economy (or the nonfarm business economy) and to the manufacturing sector.
- 6) International trade constraints as determined in Task 2.

E. Estimates of production levels and resource requirements established under C. above must be tested for conformance to the specific factor constraints described in D. If production and resource estimates do not conform, nondefense output must be reduced until conformance is achieved. This would be done by simulating the macroeconomic model using add factors or other adjustments until conformance is achieved. Final estimates of production levels and resource requirements must be consistent with the given defense requirements and the input constraints specified in D.

- F. Show division of civilian economy into essential civilian, basic industrial and phantom tier, showing analytical justifications for the distinctions.
- G. Compare results to NSC guidance in the 1976 Phase II study and estimate the cost of any actions necessary to meet that guidance.

TASK 2: INTERNATIONAL TRADE

1980 Assumptions and Methodology

In the 1980 goals, it was assumed that imports and exports of goods and services would be at 100 percent of peacetime levels in the mobilization year and in wartime exports would fall only gradually to 93 percent in the third war year while imports fell immediately to 62 percent. It is assumed that we continue to export automobiles at 100, 50, 25 and 12-1/2 percent of peacetime levels. This shift in trade flows is unprecedented in wartime. The IDA (1977) study notes that "A cursory comparison of the assumptions with the historical data reveals that they run exactly counter to each other. Historically, exports (due to controls and lost markets) have fallen and imports (due to expanded wartime demands) have risen rapidly."

1983 Study

To what extent have procedures been changed in the 1983 study to deal with this imbalance?

Evaluation

How would the international trade projections be changed if they were derived as follows? (Please derive results consistent with Task 1 above and Tasks 6 and 9 below and compare results to projections underlying the silver scenario, etc.)

A. Import and export flows would be substantially modified under wartime conditions. Please provide country-by-country (or region-by-region) judgements of how wartime conditions would change import and export flows. The factors influencing these changes are:

- Traditional trading patterns and the potential for diversion of production-related imports away from war zones to the U.S.
- Pattern and volume of demand, including consumption and production, for imports into war zones and the U.S.

- Political situation in source countries.
- Impediments to transportation to, from, and within the war zones.
- Capacity available and utilized plus any additions.
- Potential interruption of trade payment equilibrium. The surrogate for this is the balance of merchandise imports and exports.

TASK 3: ECONOMIC POLICY ASSUMPTIONS

- A. Describe all wartime government economic policy assumptions underlying the base case, the silver scenario, and the final output levels derived in Task 1 above. Macro policies examined should include:
- 1) For fiscal policy, provide explicit assumptions concerning nondefense Federal spending (purchases of goods, purchases of services, transfers, subsidies, grants and net interest), tax policy, receipts by source, NIA deficit and, if available, unified budget and off-budget deficits.
 - 2) For monetary policy, provide explicit assumptions concerning the real interest rate path and, as necessary, other monetary variables determining output levels. Describe paths for selected short and long-term interest rates, reserves and monetary aggregates.
 - 3) Describe other economic interventions assumed such as: a) price and quantity controls, b) stockpile release, c) labor policy, d) trade diversions and restrictions, e) credit policies, and f) inducements to private investment for defense purposes.
 - 4) In the 1980 study, the inflation was low despite rapid money supply growth, low unemployment, and no wage and price controls. Test the relationship between money supply changes and inflation using a monetarist model, e.g. the St. Louis Fed model or a DRI model which contains a monetary block.
- B. Describe the general and relative price impacts of the output levels and macro policies described above.
- C. Describe trade policies.

TASK 4. COMPARATIVE ASSESSMENT

The 1980 stockpile goals were premised on a projected wartime economy which differed from actual World War II experience. For example, in World War II the civilian economy declined, government nondefense spending declined, private investment declined, and consumption grew only 2% annually. By contrast the 1980 stockpile goals projected increases in the nondefense economy, in government nondefense spending, and private investment as well as 7% growth rates in personal consumption.

Drawing on experience in prior wars and mobilizations, please evaluate the reasonableness of the policies, programs and economic outcomes described above as well as those in the silver scenario.

Compare hypothetical mobilization and wartime levels and distribution of output to actual results in previous wars.

In addition, flow and stock inputs should be compared. Compare stocks of consumer durables at the beginning of the war as well as assumptions on the state of the economy at the end of the war with previous experience. Consideration should be given to the stocks of capital and consumer goods, employment, income and spending. Given the similarity of the war scenario to World War II, a careful comparison to that period is important.

TASK 5: DOMESTIC MATERIALS SUPPLY

1980 Methods and Assumptions

In the 1980 stockpile goals, analysts derived Schedule A ("normal" operating conditions) and Schedule B ("maximum sustainable rates allowing reasonable downtime for maintenance and repair") supply estimates without considering major economic forces driving capacity and supply increases. These include: massive investments to expand capacity; assumed DPA controls, subsidies, and financing which expanded capacity during the Korean War; increased wartime prices; and possibly reduced imports. Analysts were instructed to consider only existing sources and to ignore potential capacity increases. These procedures produced contradictions. The macro model projects that metals industry capacity grows 27% over the war and capacity utilization averages 122%, implying at least a 55% increase in output. However, Schedule B materials projections show only 3%-5% increases during the war.

1983 Study

To what extent have procedures been changed in the 1983 study to deal with these concerns?

Evaluation

How would the supply estimates be altered if the following steps were introduced into the procedure? (Please derive supply estimates for the 12-15 stockpile minerals with highest valued goals and compare to present assumptions)

- A. For each mineral, based on historical experience, estimate the time and cost required to expand domestic productive capacity for mining and processing by factors of 10%, 20%, 30% and 50%.
- B. Estimate how expansion could be accelerated in mobilization contingencies including the economic conditions specified in the wartime scenario.
- C. Estimate the maximum possible expansion obtainable in periods of one, two, three, four years given wartime contingencies, market forces, and government policies to accelerate capacity expansions.
- D. Estimate the increases in production attainable by operating existing capacity for extended periods at rates of 120%.
- E. Identify those materials for which rapid, expanded wartime capacity is most desirable and relate expansion to the programmed investment increases, detailed in Task 1.

TASK 6: INTERNATIONAL MATERIALS SUPPLY

1980 Methods and Assumptions

In the 1980 stockpile goals, analysts prepared estimates of materials available to the U.S. from abroad under Schedule A and Schedule B. The former represented "normal" operating and economic conditions while the latter represented "maximum sustainable rates allowing reasonable downtime for maintenance and repair." Neither schedule is based upon the wartime economic environment implicit in the mobilization scenario including reduced materials imports in war-zone nations, higher prices to induce capacity expansion, and exporting-nations' needs to establish new trade relations.

1983 Study

To what extent have procedures been changed in the 1983 study to deal with these concerns?

Evaluation

How would the supply estimates be altered if the following steps were introduced into the procedures? (Please derive supply estimates for the 12-15 stockpile commodities with largest goals and compare to present assumptions.)

- A. Identify, by commodity and by producer, the normal peacetime exports (total and percentage) to each war-zone nation.
- B. Identify, by commodity and by producer, the total productive capacity and exports which could be added under wartime pressures including higher prices in each year of a four-year period.
- C. Based on the wartime scenario, identify, by war-zone nation, the projected level of industrial operation, likely levels of minerals and materials utilization and, in consideration of shipping difficulties, the likely level of commodity imports.
- D. Based on A-C, show levels of commodities available to U.S.

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TASK 7: MATERIALS DEMAND

1980 Methods and Assumptions

In the 1980 stockpile goals, analysts estimated materials demand and substitution possibilities based on historic consumption patterns over 1960-77 and on engineering substitution rates unrelated to price. Materials consumption ratios were derived in many cases from regressions with very low explanatory power and in which price was never considered. Trend terms were included which in many cases show wartime materials consumption growing even for low priority goods, and in the face of substantial price increases. For substitution ratios, analysts assumed production processes would not change, even over a four-year war, to reduce products' contents of costly, critical materials. These procedures overestimate materials consumption and underestimate substitution possibilities. For example, it is estimated that substitution will reduce cobalt consumption during the three war years by only 6%. By contrast, when cobalt prices rose in 1979, consumption dropped by nearly a third in only a year.

1983 Study

To what extent have procedures been changed in the 1983 study to deal with these concerns? -

Evaluation

How would the demand estimates be altered if the following steps were introduced into the procedure? (Please derive demand estimates for the 12-15 stockpile commodities with largest goals and compare to present results.)

- A. For major stockpile commodities, estimate short-run and long-run price elasticities of demand.
- B. For these commodities, estimate likely wartime price increases and estimate the short-term and long-term reduction in wartime consumption.
- C. Estimate the effects on the magnitude and composition of civilian output of possible rationing programs to reduce materials consumption by 25%, 50%, and 75%.

TASK 8: MOBILIZATION YEAR

1980 Methods and Assumptions

Presidential guidance specifies that stockpile planning is to assume that a warning-year precedes the hypothetical three-year war. The NSC Phase II report found that the warning-year increases stockpile goals by nearly 30% because, under existing assumptions and procedures, the warning-year increases projected minerals consumption more than it increases supplies. The mobilization increases the base against which wartime consumption, investment, and output are projected and thereby drives up estimated materials demands. However, supply assumptions are derived without any reference to the scenario warning-year assumptions.

1983 Study

To what extent have procedures been changed in the 1983 study to deal with these concerns?

Evaluation

How would supply assumptions change if the following steps were included in the procedure? (Please derive supply estimates for the 12-15 stockpile minerals with largest goals and compare to present assumptions).

- A. Identify those industries whose output will rise most rapidly in the mobilization year, and the pressures which their expansion will place on minerals markets.
- B. Identify those industries which will undertake investments in the mobilization year and the additional projected materials needs they would generate.
- C. In conjunction with Tasks 5 and 6, identify for each critical mineral, for domestic and foreign suppliers the capacity and supply which would be induced by the accelerated economic activity, rising prices, increased factory orders, rise in industrial investments, and government mobilization programs.

TASK 9: POLITICAL RELIABILITY

1980 Methods and Assumptions

In the 1980 stockpile goals, political reliability ratings were based on a complex series of equations. The validity and reliability of the models have not been tested and the NSC Phase II study stated the model would be improved. The 1980 ratings were not based on a wartime scenario, and have not been reviewed by policy officials in State, CIA, or NSC. The rankings produced paradoxical results.

1983 Study

To what extent have methods been changed in the 1983 goals study to deal with these concerns?

Evaluation

How would the reliability rankings differ if the following steps were introduced into the procedure? (Please derive rankings for the 20-25 most significant non-European producers under the following procedures and compare to present rankings.)

- A. Identify those nations which are exporters of strategic and critical materials and which are outside the assumed war zone.
- B. For each nation, estimate the available wartime market for its exports, considering the reduced industrial activity in war-zone nations and likely shipping losses.
- C. For each nation, identify the potential U.S. market, considering the likely wartime increases in commodity prices and scenario-based assumptions on shipping losses.
- D. For each nation, estimate its critical imports, normal suppliers, likely wartime suppliers in light of scenario assumptions, and its need for foreign exchange earnings to finance critical imports.
- E. For each nation, estimate the likely financial and economic impact upon its wartime economy of losing the U.S. market (imports and exports) in addition to the war-zone markets.

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- F. Provide an empirical assessment of the validity and reliability of FEMA's procedures, noting the theoretical and empirical justification for each variable and discussing the procedure's ability to have predicted wartime reliability for World War II as of 1939. For example, were 70% of the nations in the world unreliable for essential civilian needs, and would this model have predicted which 70% they were?
- G. Submit the results of the economic evaluation (Steps A-E) together with FEMA's political reliability rankings, the evaluation of their procedures (Step F), and the detailed scenario assumptions to an interagency panel of high-level policy officials chaired by State and CIA for final determination of political reliability ratings.

